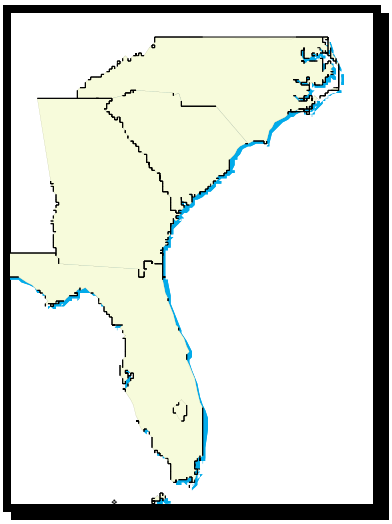
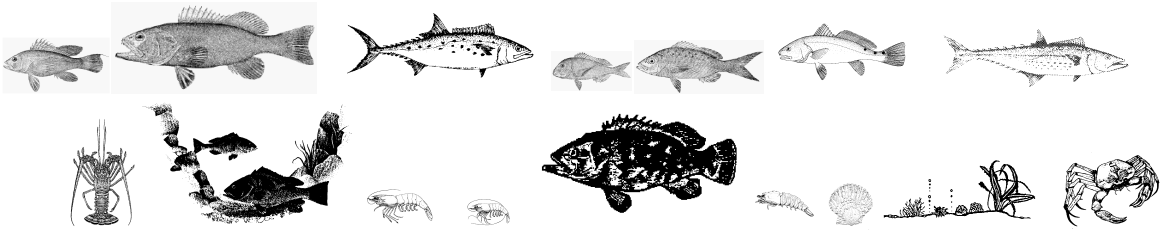
Products and Services for the Identification of Essential Fish Habitat in the South Atlantic Region





Submitted to

The South Atlantic Fishery Management Council

by

Strategic Environmental Assessments Division
National Ocean Service

February 4, 1998

This document describes the first suite of products developed by NOAA SEA Division for the South Atlantic Fishery Management Council to identify Essential Fish Habitat (EFH) in the south Atlantic region. For a complete description of the joint NOAA and Council effort, please refer to the Work Plan*: Products and Services for the Identification of Essential Fish Habitat in the South Atlantic Region* (SEAD/SAFMC 1997), available from NOAA's SEA Division.

This **DRAFT** site was developed to exchange information between NOAA and the Council for review purposes. The site will continue to evolve as information on species distributions, relative abundances, and life histories is updated. In the future, additional species and habitat databases, and associated maps, will be incorporated from NOAA, MMS, and State studies.

To view the products delivered to the Council, please refer to the NOAA Biogeographic Characterization Branch South Atlantic EFH website:

http://coynemac.nos.noaa.gov/sa-efh/

The appropriate citation for this document is:

Strategic Environmental Assessments Division, Southeast Fisheries Science Center, and South Atlantic Fisheries Management Council. 1998. Product overview: Products and Services for the identification of Essential Fish Habitat in the South Atlantic. Silver Spring, MD: National Ocean Service; Beaufort, NC: National Marine Fisheries Service; and Charleston, SC: South Atlantic Fisheries Management Council. 11 pp.

PRODUCT OVERVIEW

This document describes the products developed cooperatively by the National Oceanic and Atmospheric Administration's (NOAA's) National Ocean Service (NOS), and the South Atlantic Fishery Management Council (SAFMC) to identify Essential Fish Habitat (EFH) in the Southeastern US. In addition, the SAFMC is cooperatively developing the remainder of the South Atlantic EFH products with state partners, the NMFS - Beaufort Lab, and NOS's Coastal Services Center. The results of the NOS work and other products will be used by the South Atlantic Fishery Management Council to develop the habitat plan that will serve as the source document for the comprehensive habitat amendment in accordance with the EFH requirements of the re-authorized Magnuson-Stevens Fisheries Conservation and Management Act. Generating the map products would have not been possible without the outstanding cooperation of the state environmental agencies, federal agencies, and academic institutions in the South Atlantic region, which provided the bulk of the estuarine fishery-independent monitoring data and peer review of map products developed from those data (see Acknowledgments).

In addition we thank our colleagues at the NOAA HAZMAT Division as their development of the South Atlantic Environmental Sensitivity Index (ESI) maps (NOAA 1997a, 1997b) provided the initial opportunity to map the Estuarine Living Marine Resources (ELMR) tabular fishery database.

Nationwide, NOS is conducting the following four tasks to support EFH work.

Task 1. Conduct EFH needs assessment.
Task 2. Provide Digital Spatial Framework for EFH mapping.
Task 3. Provide existing biological and habitat databases.
Task 4. Accelerate development of ArcView species mapping tool.

The items listed below were developed cooperatively by NOS and the SAFMC to support EFH work in the Southeast.

Item 1. Needs assessment.
Item 2. Work plan.
Item 3. Digital Spatial Framework.
Item 4. Additional Data compilation.
Item 5. ELMR species/estuary tables.
Item 6. Selected estuarine species maps.
Item 7. Digitized atlas maps for offshore species.

Item 8. Estuary/embayment habitat maps.
Item 9. Offshore habitat maps.
Item 10. Regional salinity and relative abundance maps.
Item 11. Species Life history tables

NOS's BCB has built upon three of their major strategic assessment programs in conducting the South Atlantic EFH work. The Estuarine Living Marine Resources (ELMR) program has developed relative abundance estimates for 40 species in 20 South Atlantic estuaries (Nelson *et al.* 1991), and has also developed detailed life history summaries for many of these species (Pattillo *et al.* 1997). The Coastal Assessment Framework (SEA Division 1993) contains geographic information system (GIS) files for coastlines and watersheds for the contiguous states.

Areas Covered. Information and maps were developed for both estuarine and offshore areas in the U.S. Exclusive Economic Zone. Twenty estuaries in the South Atlantic region were studied (Table 1)

Table 1. South Atlantic estuaries for EFH mapping of species and habitat. Habitat information will be organized by estuarine and coastal drainage areas (SEAD 1997).

Albemarle Sound, NC
Pamlico Sound, NC
Pamlico/Pungo Rivers, NC
Neuse River, NC
Bogue Sound, NC
New River, NC
Cape Fear River, NC
Winyah Bay, SC
North/South Santee River, SC
Charleston Harbor, SC
St. Helena Sound, SC
Broad River, SC
Savannah River, GA
Ossabaw Sound, GA
St. Catherine/Sapelo Sound, GA
Altamaha River, GA
St. Andrew/St. Simon Sound, GA
St. Johns River, FL
Indian River, FL
Biscayne Bay, FL

Species Covered. Managed species in the South Atlantic are listed in Table 2. Because of the time constraints imposed by the Magnuson-Stevens Act, 10 representative species were chosen by NOS, NMFS, and the Council. At least one representative species was chosen for each fisheries management plan in this initial effort. Table also 2 lists those species common to both the ELMR Program and managed species of the South Atlantic, and which are the focus of this site. In the future, joint NOS and NMFS efforts may address additional species, life stages, habitats, as well as threats to EFH.

Table 2. South Atlantic Fishery Management Council managed species, and priorities for EFH product development. The seven ELMR species identified as high-priority for EFH product development (Table 2) are indicated.

FMP/ Species	Priority[1]
Shrimp Fishery	
Brown shrimp (ELMR)	X
Pink shrimp (ELMR)	X
Rock shrimp	O
Royal red shrimp	O
Seabob shrimp	O
White shrimp (ELMR)	X
Golden crab	O
Spiny lobster	O
Coastal Migratory Pelagics	
Cero	O
Cobia (ELMR)	X
Dolphin	O
King mackerel	X
Little tunny	O
Spanish mackerel (ELMR)	X
SAtl Snapper- Grouper[2]	
Gray triggerfish	X
Queen triggerfish	O
Ocean triggerfish	O
Yellow jack	O
Blue runner	O
Crevalle jack	O
Bar jack	O
Greater amberjack	X
Lesser amberjack	X
Almaco jack	O
Banded rudderfish	O
Spadefish	O
Black margate	O
Porkfish	O
Margate	O
Tomtate	O
Smallmouth grunt	O
French grunt	O
Spanish grunt	O
Cottonwick	O
Sailors choice	O
White grunt	O
Blue stripe grunt	O
Hogfish	X
Puddingwife	O
Black snapper	O
Queen snapper	O
Mutton snapper	X
Schoolmaster	O
Blackfin snapper	O
Red snapper	X

FMP/ Species	Priority[1]
SAtl Snapper-Grouper (Cont.)	
Cubera snapper	O
Gray snapper (ELMR)	X
Mahogany snapper	O
Dog snapper	O
Lane snapper	O
Silk snapper	O
Yellowtail snapper	X
Vermilion snapper	X
Blueline tilefish	O
Golden tilefish	O
Sand tilefish	O
Wreckfish	O
Bank sea bass	O
Rock sea bass	O
Black sea bass	X
Rock hind	O
Graysby	O
Speckled hind	O
Yellowedge grouper	O
Coney	O
Red hind	O
Jewfish	O
Red grouper	O
Misty grouper	O
Warsaw grouper	O
Snowy grouper	O
Nassau grouper	O
Black grouper	O
Yellowmouth grouper	O
Gag	X
Scamp	X
Tiger grouper	O
Yellowfin grouper	O
Sheepshead	O
Grass porgy	O
Jolthead porgy	O
Saucereye porgy	O
Whitebone porgy	O
Knobbed porgy	O
Red porgy	X
Longspine porgy	O
Scup	O
Red Drum	
Red drum (ELMR)	X
Calico Scallops	
Calico scallops	O

[1] Priority codes:
X - high priority; products to be developed under this work plan
O - lower priority; products to be developed in the future

[2] Snapper-Grouper complex will be represented by location of hard-bottom habitat.

Table 3. Seven estuarine-dependent ELMR and 3 coastal species identified as high-priority for South Atlantic Essential Fish Habitat designation (SEAD 1997).

Invertebrates (3):
- Brown shrimp (ELMR)
- Pink shrimp (ELMR)
- White shrimp (ELMR)

Fishes (4):
- Cobia (ELMR)
- Gray snapper (ELMR)
- Spanish mackerel (ELMR)
- Red drum (ELMR)
- Gag (Non-ELMR)
- Black seabass (Non-ELMR)
- Red porgy (Non-ELMR)

STATUS
Listed below are the EFH tasks and their summary descriptions from the work plan. The status and results of the initial products delivered to the Council are described.

1. Needs Assessment. Meetings and telephone calls will be conducted to identify the types of EFH products to be developed for the South Atlantic, and to determine how NOS can support their development.
COMPLETED Oct. 1997

2. Work Plan. A detailed description of products and services, estimated costs, and schedule has been developed.
COMPLETED Nov. 1997

3. Digital Spatial Framework. This item is the South Atlantic portion of the nation-wide Digital Spatial Framework. It will contain watersheds, river reaches, estuarine and coastal embayment boundaries, estuarine isohalines, and offshore boundaries. It will be used for all species and habitat mapping. Map scales will range between 1:250K for regional maps, 1:80K for state maps, and 1:24K for maps of individual estuaries.
COMPLETED Dec. 1997 (1:24 K & 1:250 K digital shoreline available)

4. Additional Data Compilation. Many of the major fishery-independent data sets for the South Atlantic have already been obtained and processed into a usable form by SEA Division (e.g., state trawl surveys), but some additional data sets will be obtained and processed for the EFH project. The SCDNR Estuarine Survey, Charleston Harbor, Cooper and Santee River studies will be used to update the species distribution data in the ELMR South Atlantic component. In Florida, data will be obtained and processed from the Florida Marine Research Institute Fishery Independent Monitoring Program and data from the University of Miami. In marine waters the MARMAP and SEAMAP data bases will be used to produce GIS coverages of selected species distribution and habitat maps.
COMPLETED Dec. 1997
(**Note:** SCDNR data have not been included in initial products due to time constraints)

5. ELMR Species/Estuary Tables. ELMR species/estuary tables will be updated to contain data for relative abundance (highly abundant, abundant, common, rare, not found, and no data) in each estuary, by five life stages (adult, spawning, egg, larva, and juvenile), and month for three (0-0.5, 0.5-25, >25 ppt) to five (0-0.5, 0.5-5, 5-15, 15-25, and >25 ppt) seasonal salinity zones for the existing ELMR species. Seven existing ELMR species are high-priority species for South Atlantic EFH work (Table

3). For adults and juveniles, these updates will be developed by compiling relevant state resource survey data sets; analyzing the compiled data to determine relative abundance scales (based on density data) and relative abundances by estuary, salinity zone, and month; estimating relative abundances where adequate data are not available; and conducting peer review in each state. For larvae, spawning, and eggs, the existing ELMR information (Nelson et al. 1991) will be revised using literature and peer review, to reflect the three to five seasonal salinity zone spatial framework. The species/estuary tables will be provided in a digital format suitable for developing tables and maps.

The updates to the North Carolina and Georgia ELMR data were reviewed while developing NOAA's Environmental Sensitivity Index database (NOAA 1997a, 1997b). The ELMR data for South Carolina are from the original ELMR data set, as no new estuarine data were available within the EFH timeframes. The ELMR data for Florida were updated for a few selected species based on FMRI and University of Miami data. All salinity data were updated and mapped based on 3 to 5 seasonal salinity zones where applicable.

COMPLETED Jan. 1998 FOR 7 PRIORITY SPECIES

(**Note:** additional 33 ELMR species/life stages draft tables completed and now under review)

6. Selected Estuarine Species Maps. Arc/Info digital and hardcopy maps will be developed by estuary for the seven estuarine species (Table 2). These maps will portray the updated ELMR data organized by estuary by state. They will be developed using the ELMR species/estuary tables from item 5 above.

COMPLETED Jan. 1998

7. Digitized Atlas Maps of the Offshore Distribution of Species. Arc/Info covers will be developed by digitizing existing maps of managed species in NOAA's 1980 *East Coast Data Atlas* (Ray et al. 1980). Four databases from the SCDNR will complement the Atlas maps. The SCDNR species ingress data will be mapped for a few high priority species (e.g., gag grouper, Spanish mackerel). In addition, the SCDNR will provide MARMAP tag, trawl, and trap data. SEA will develop a series of standardized maps for selected managed species that have been tagged or collected.

COMPLETED Jan. 1998 for Atlas species.

(Note: SCDNR data have not been included in initial products due to time constraints**)**

8. Estuary/Embayment Habitat Maps. Mapping estuarine and coastal embayment salinity and wetlands will be addressed. Salinity maps will be developed and printed for each estuary and coastal embayment, and will consist of three to five salinity zones (0-0.5, 0.5-5, 5-15, 15-25, and >25 ppt) for four salinity seasons (low,

increasing, high, and decreasing). SEA Division has provided its National Coastal Wetlands Inventory report (Field et al. 1991) to the Council. This report provides acreage data by wetland type found in each estuarine drainage area and associated coastal counties of the South Atlantic. The national responsibility for assessing seagrass distributions in the Southeast Region for the EFH program has been assigned to the NMFS laboratory in Beaufort, North Carolina.
COMPLETED Jan. 1998 for estuarine salinity habitat maps.

9. Offshore Habitat Maps. SEA Division will provide a digital database and maps of salinity and temperature by 10 x 10 min grid cells for seven depth zones for the South Atlantic Region. This robust database was recently completed for SEA under contract by Dynalysis of Princeton. The compiled digital database was derived from hydrographic casts.
COMPLETED Jan. 1998 - salinity, temperature by depth summary data delivered. Final digital data on CD rom available Spring 1998.

10. Regional Salinity and Relative Abundance Maps. Mapping approaches will be developed to portray salinity and species relative abundances for estuaries and coastal embayments on state and/or regional maps. Depending on data availability, the maps will be produced at various scales: 1:24K, 1:80K, and 1:250K. For species relative abundances, these maps will be developed only for juveniles of estuarine species (Table 2) (Nelson et al. 1991). The species maps will show the highest juvenile relative abundance in any salinity zone by season for each estuary.
COMPLETED Jan. 1998

11. Life History Tables. Tabular descriptions of habitat associations will be prepared by life stage for each of the seven high-priority species (Table 2). SEA will have primary responsibility for this item, and SAFMC in cooperation with the NMFS-Beaufort Lab and the University of Miami will provide review of the information. These tables will show how each species uses the environment, and will provide the information needed to assess the relative importance of different habitat types. The three tables developed are: 1) Biological Attributes; 2) Habitat Associations; and 3) Reproduction. For the seven ELMR species designated as high-priority EFH (Table 3), these are based on tables developed for these species in the Gulf of Mexico, with some revisions (Pattillo et al. 1997).
COMPLETED Jan. 1998

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ACKNOWLEDGMENTS

Without the work and data provided by the following institutions, the salinity and ELMR databases could have not been updated to support the EFH initiative in the South Atlantic. The initial effort to convert the ELMR tabular database to a GIS mapped product was made possible via the joint NOAA HAZMAT and SEA Division efforts to support Environmental Sensitivity Index Mapping (NOAA 1997a, 1997b). We sincerely express our gratitude to our colleagues throughout the region who have supported us in the development of species and habitat databases over the last 15 years.

SALINITY

BIOLOGY

- The authors would like to thank the North Carolina Division of Marine Fisheries under the coordination of Katy West.
- Bob VanDolah and Jack McGovern of South Carolina Department of Natural Resources
- Susan Shipman and colleagues of Georgia's Department of Natural Resources,
- Bob McMichael of Florida's Marine Research Institute, and Jerry Ault and Ken Lideman of the Univeristy of Miami.

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